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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/FI93/00289 (22) International Filing Date: 8 July 1993 (08.07.93) (30) Priority data: <div style="display: flex; justify-content: space-between; padding: 5px 0;"> 923136 8 July 1992 (08.07.92) FI </div> (71) Applicant: AHLSTRÖM EURAPAK OY [FI/FI]; P.O. Box 100, FIN-27501 Kauttua (FI). (72) Inventors: ALI-AIJÄLÄ, Marjo ; Varkaudenmäki 454, FIN-27500 Kauttua (FI). LINDH, Lars-Erik ; Kanavanmäki 9 A 1, FIN-00840 Helsinki (FI). (74) Agent: A. AHLSTROM CORPORATION; Patent Department, P.O. Box 18, FIN-48601 Karhula (FI).		(81) Designated States: NO, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i>
(54) Title: LAMINATED FOIL		
(57) Abstract <p>The present invention relates to a laminated foil, the raw materials of which can be separated and recovered. The bond (14) between the layers (12, 16) of the laminate keeps the layers together when no external force is exerted on the layers, but allows the layers to be separated from each other either by hand or mechanically. Bondless edges (22) have been formed on the foil, i.e. the bonding material has been removed from the edge in order to facilitate the separation of the layers. A foil like this can be cut into blanks to be used as wrappings in packing. Preferably the bondless edges are formed at the packing machine. Thereby it is easy for the consumer to get a hold of the pre-separated edges (32) of the layers and to separate the layers from each other by pulling them apart by hand.</p>		

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LAMINATED FOIL

5 The present invention relates to a laminated foil, especially for packing purposes, the foil being produced as an endless web from at least two webs of different kinds of foils, from which foil it is convenient to cut rectangular blanks to be used as packings, as wide as the original endless foil.

10 The packing industry has lately paid considerably attention to the recovery and recyclability of packing materials. For example, publication WO 92/00190 discloses a container for foodstuffs, which container is made of a plastic-covered metal foil, the thickness of the foil
15 being of the order of some μm . The container can be recycled by melting the metal, whereby the plastic is combusted into carbon dioxide, and the separated metal can be re-used. This kind of method of recycling is not always worth applying, but it is advisable to try to get
20 the different materials of the container separated so that the materials can be recycled separately.

Laminates comprising layers of different materials are being widely used as wrappings. The layers of different
25 materials should be able of being separated simply and easily for recovery. Butter, margarine or the like are packed for retail purposes to parchment-wax-Al-foil laminates and to parchment-Al-PE-foil laminates. Aluminium foil is popular in packings of this kind
30 because of its foldability. This is important when there are no other means of closing besides folding. It is easy to fold a foil so that it stays tightly folded against the product. Besides, metallized plastic foils have very desirable properties for many packing applications,
35 especially for foodstuff packing, as the layer of metal prevents the penetration of humidity, oxygen and smells. Thus, metallized foils are very popular packing materials, but still no methods of making them easily recyclable have been disclosed. It is imperative that the

lamine layers can be easily and quickly separated by the consumer.

5 The object of the present invention is to provide a laminated foil for correcting the above-mentioned drawbacks, i.e. to provide for an easy separation of packing laminates for further treatment, if any, of the different materials.

10 Thus, the present invention relates to a laminated foil for packing purposes, the foil being produced as an endless web and consisting of at least two different webs of foil, from which foil it is convenient to cut rectangular blanks having the same width as the endless
15 web. A characterizing feature of the invention is that the bond between the layers is such that it keeps the layers together when no external force is exerted on the layers, but allows the layers to be separated either manually or mechanically and that the bond connects the
20 layers essentially at other places than the edge or edges of the foil, the edge being arranged at the longitudinal edges of the endless web.

The invention relates also to blanks made of the
25 laminated foil and their usage.

In a method according to the present invention for producing a laminated foil an endless web of laminated foil, comprising at least two different layers bonded
30 together in a manner known per se, and from which can be cut blanks, preferably rectangular, having the same width as the endless foil, is directed to a packing machine. An essential feature of the invention is that the bond between the layers is broken along the edge of the
35 endless web at a preset depth for forming a bondless edge prior to forming the blanks. Otherwise the bond is such as to keep the layers together when no external pressure is exerted on them, but it allows the layers to be separated either manually or mechanically.

The problem that the consumer faces with separating the layers is specially that of beginning the separation of layers. Finding a suitable starting point is not easy, as the thin foil materials are tightly fastened together.

5 According to the present invention, the problem is solved by partly opening the edge, i.e. starting the separation already during the wrapping of the product, even before the product has been delivered to the consumer. Thus it is easy for the consumer to get a hold of the layers to

10 be separated, e.g. a plastic foil and a metal foil, when the consumer separates them for recovery.

According to a preferable embodiment of the invention the layers are compressed together subsequent to the breaking

15 of the bond in the edges. Thus the appearance of the foil is kept neat. The layers are compressed together so that no re-laminating occurs. Thus the separation of the layers will still be easy for the consumer.

20 The bondless edge must be wide enough to enable the consumer to get a good hold of the edges of the layers. Usually a width of about 10 mm is sufficient.

The invention is not limited to laminated foils made of

25 any special materials. Neither is the type of the bonding material limited. The only limitation is that by means of a bonding material it is possible to form a bond between the layers keeping the layers together when no external force is exerted on the layers, but that allows the

30 layers to be separated either manually or mechanically. Besides, it is advisable to choose the strength of the layer material such that the material can be separated as a whole surface and that it is not torn apart until the consumer has completely separated the layers. The

35 invention is especially suitable for use in metal-plastic laminated foils which are widely used in different packings, e.g., as wrappings or wrapped packings.

The method of present invention can very easily be carried out. When the product, e.g. butter, margarine, cheese, chocolate or the like is packed in a laminated wrapping, the bondless edge according to the invention can be formed on the laminated web by means of a tool arranged at the packing machine, the tool being, e.g., a blade-like apparatus or a rotating disc. The web of laminated foil is fed to the packing machine in a manner known per se, and before the web is cut into wrapping blanks the tool separates the layers of the laminate on the width of a preset edge and, if desired, compresses the layers back together. Subsequent to this, the blank is cut off from the web and the product is wrapped into this piece of laminated material.

The bondless edge does not have to be constant in width, but a desired pattern can also be produced. The width may, for example, change so that the widest bondless area is at the corners of the blank to be formed. The width may also fluctuate so that the widest bondless area is located at intervals along the longitudinal edge of web from which the blank are cut. Naturally, other forms of the bondless edge are also possible.

It is also possible to form the bondless edge at only one edge of the web. For the consumer it is naturally simpler if both the edges are bondless.

In the following, the invention is described in more detail by way of reference to the enclosed drawings, of which

fig. 1a illustrates in cross-section a laminated foil structure before the method according to the present invention has been applied to it,
fig. 1b illustrates in cross-section a laminated foil according to the invention, and
fig. 2 illustrates, as seen from above, an embodiment for carrying out the method according to the invention,

including the web into which the bondless edges are being formed.

5 The laminated foil 10 according to fig. 1a comprises an aluminium foil 12, a bonding material 14 and a plastic foil 16. Such a laminated foil can be especially used for packing butter, margarine, cheese or the like by folding. The bonding material is spread on the whole surface of both the aluminium and plastic foils. Preferably, the
10 plastic is biaxially oriented polypropylene, HD-polyethylene or polyester, the thickness of which is approx. 15-60 μm . The bonding material is most suitably a wax-based agent (about 5-20 g/m^2). The thickness of the aluminium foil is most preferably 6-12 μm . The strength
15 of the bond between the aluminium foil and the plastic is preferably 2-15 N/m. A text or the like print 18 can be arranged on the aluminium layer, if desired.

20 In fig. 2. a laminated foil 10 according to the invention is being fed to a packing apparatus (not shown), into which tools, i.e. thin, rotating discs 20 have been arranged for breaking the bonding material between the aluminium foil and the plastic foil, whereby a bondless edge area 22 is formed. In the fig. 2 embodiment the
25 width 24 of the bondless edge is constant, but the movement of the rotating disc can be regulated by known means in order to change the width. A scraper 26 can be arranged in connection with the disc for removing the bonding material accumulating on the disc. After this,
30 the delaminated parts of the surface are most suitably compressed together to form a neat edge. The compression must be carried out so that no re-laminating occurs.

35 Subsequent to this the blanks are cut from the web, the surface of the blanks comprising the area between the longitudinal edges 28 of the endless web 10 and the imaginary transverse lines 30.

In a laminated foil according to the invention the laminating bond has been partly removed, as can be seen from fig. 1b, whereby grip surfaces 32 have been formed between the above-mentioned foils. By means of these
5 foils the consumer is able to get a hold for separating both the plastic foil and the Al-foil and so to recover the materials separately for subsequent recycling.

We claim:

1. A laminated foil (10a) for packing purposes, the foil being made as an endless web of at least two different webs of foil, which laminated foil is capable of being cut into preferably rectangular blanks having the same width as the endless web, **characterized** in that the bond (14) between the webs of foil is sufficient to keep the layers (12, 16) together when no external force is exerted on the layers, but the bond allows the layers to be separated easily either by hand or mechanically, and that the bond keeping the layers together has been applied to essentially all other surfaces of the foil between the layers except the longitudinal edges of the web.
2. A laminated foil according to claim 1, **characterized** in that the bondless edge is formed by breaking the bond between the layers (12, 16) by means of a suitable tool (20).
3. A laminated foil according to claim 1 or 2, **characterized** in that the width (24) of the edge (22) is such that it is easy to get a hold of the formed grip surfaces (32) for separating the layers (12, 16).
4. A laminated foil according to claim 3, **characterized** in that the width (24) of the edge (24) is about 10 mm.
5. A laminated foil according to any of claims 1-4, **characterized** in that the laminated foil consists of an aluminium foil (12) and a plastic foil (16).
6. A laminated foil according to claim 5, **characterized** in that the bond (14) between the layers (12, 16) is formed by means of a wax-based bonding material.
7. A blank made of the foil described in any of claims 1-6.

8. Use of a blank according to claim 7 for making of a wrapping or a wrapped packing.

5 9. A method of producing a laminated foil (10a), in which method an endless web (10) of laminated foil, comprising at least two different layers bonded together in a manner known *per se*, and from which can be cut blanks, preferably rectangular, having the same width as the endless foil, is directed to a packing machine,
10 **characterized** in that the bond (14) between the layers is broken along the edge (28) of the endless web at a preset depth for forming a bondless edge (22) before the blanks are formed, the bond being sufficient to keep the layers together when no external force is exerted on them, but
15 allowing the layers to be separated either manually or mechanically.

20 10. A method according to claim 9, **characterized** in that the bondless area is formed by means of a tool arranged at the packing machine, the tool comprising a blade-like part or a rotating disc (20).

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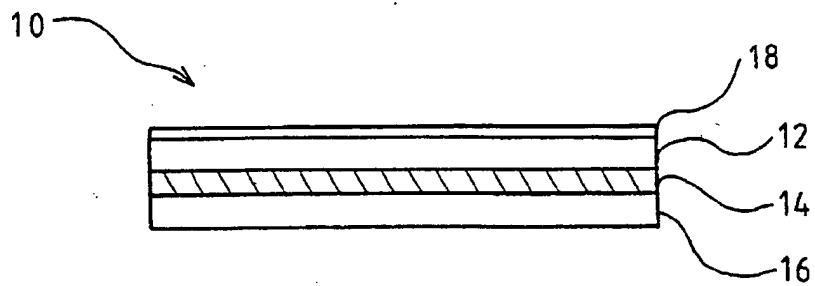


Fig. 1a

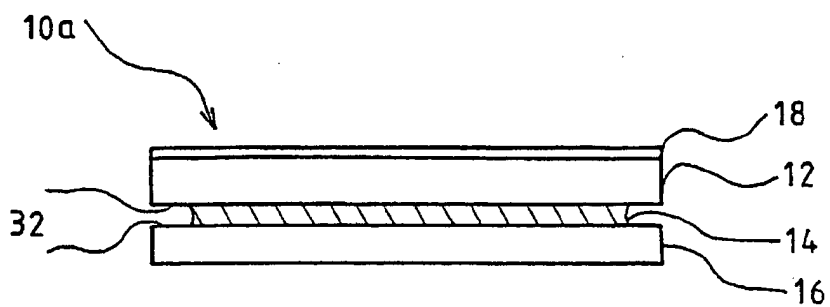


Fig. 1b

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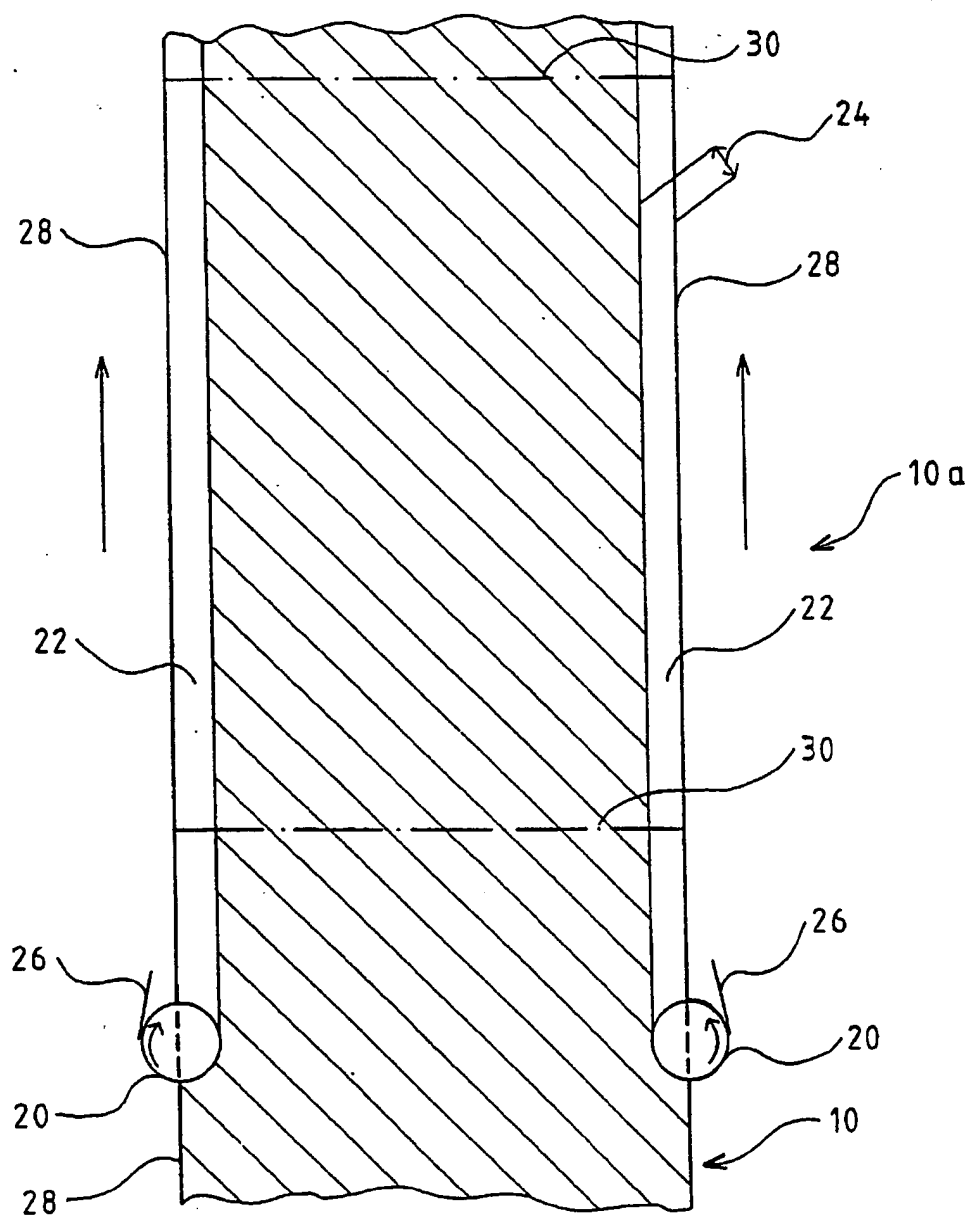


Fig. 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 93/00289

A. CLASSIFICATION OF SUBJECT MATTER

IPC5: B32B 7/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC5: B32B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, CLAIMS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP, A3, 0374629 (BAYER AG), 27 June 1990 (27.06.90), see page 7, lines 17-26 --	1-10
A	US, A, 4224379 (ISAO ICHINOSE ET AL), 23 Sept 1980 (23.09.80), see claim 1 -- -----	1-10

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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7 October 1993

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A3- 0374629	27/06/90	CA-A- 2005969 DE-A- 3842966 JP-A- 3007335 US-A- 5047272	21/06/90 28/06/90 14/01/91 10/09/91
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